Nortel Networks Symposium Agent

Planning and Engineering Guide

Product release: 2.3

Document release: Standard 2.0

Date: June 2001

NORTEL NETWORKS™

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Chapter 1

Getting started

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About this guide

Introduction

The *Symposium Agent Release 2.3 Planning and Engineering Guide* provides information for selecting and planning your Symposium Agent system.

Who should use this guide

Information in this document is intended for technical planning and purchasing personnel who are responsible for determining the requirements for installing and operating a Symposium Agent system in their organization.

Skills you need

You need knowledge and experience of products not covered in this document.

Nortel Networks product knowledge

- Meridian 1 Option 11-81 PBX or DMS-100 or MSL-100
- Symposium TAPI Service Provider for M1
- Symposium Call Center Server or Symposium Express Call Center Server
- Symposium CompuCall TAPI Server or Symposium TAPI Driver for ICM

PC experience or knowledge

- Microsoft Windows NT Workstation and Windows NT Server
- Microsoft Windows 2000 Server and Microsoft Windows 2000 Professional
- Microsoft Internet Explorer 4.0
- Microsoft Internet Information Server
- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Transaction Server
- Sybase Adaptive Server

Other experience or knowledge

- network management
- client-server systems
- Microsoft Telephony Application Programming Interface (TAPI 2.1)

For further information

- Symposium TAPI Service Provider Release 2.2 for Meridian 1, GRB-116
- Symposium TAPI Driver for ICM Product Service Introduction (PSI)

50193.16/04-99 Issue 1

- Symposium Agent 2.3, Sales and Marketing Bulletin # 1260-G
- Symposium Agent 2.3 General Release Bulletin
- Reference Guide for Installing, Configuring, and Maintaining the Symposium TAPI Service Provider for Meridian 1 Release 2, Publication ID 881938
- Symposium Agent 2.3 Installation Guide, available as a .pdf file on the Symposium Agent 2.3 CD-ROM
- Symposium Agent 2.3 online Help in HTML format

  The online Help includes information for administering the system after the installation and initial setup. The Help topics, reference information, and brief tutorials appear in a Table of Contents that you can open using your browser. The Help topics are also indexed by keywords.

  Before using the online Help, you may need to relax your browser security for the Intranet (not Internet) zone to allow the use of the ActiveX control that provides the Help Table of Contents. For instructions on browser security settings, see the section called "Running the Symposium Agent administration tool."

  Neither the Symposium Agent 2.3 Installation Guide nor the online Help is sold or distributed in paper copy.

Overview

The Symposium Agent server can be set up in two configurations. In the first configuration, as a standalone server, the Symposium Agent Server software resides on the server platform by itself. The second configuration combines the Symposium Agent server software and the TAPI Service Provider (M1 TAPI SP, CompuCall TAPI Driver or TAPI Driver for ICM) on the same server platform.

The information contained in this document explains how to plan for each configuration.

Considerations for planning and engineering

Planning and engineering involves determining the best size, platform, and location for your Symposium Agent system.

To start planning and engineering a Symposium Agent system, consider the

following questions:

- Will Symposium Call Center Server or Symposium Express Call Center Server route calls to your Symposium Agent users?
- What is the LAN connectivity for the PCs?
- What applications will you want users to screen pop on, and which data (Calling Number, Called Number/DNIS or Call/User Data) will be used to trigger the screen pops?
- Will the client PC be equipped with Windows 95,Windows 98, Windows NT 4.0 Workstation, or Windows 2000 Professional?
- How are your network domains currently set up and how will the domain requirements imposed by TAPI SP and Symposium Agent impact the current network?
- Where will the servers be located and how will they be connected?
- Will you use your own web server to support your application(s) or will you use Internet Information Server? Which server will Symposium Agent uses as it's web server? (If you use Symposium Agent's server as your web server, you may require a faster machine with more memory and larger disk drive.)
- Do you want screen pops to occur before calls are answered (when the agent's phone is ringing), when the call is answered/connected, or after the call ends?
- What is the maximum number of calls per hour the call center will handle?
- What is the number of concurrent users?

System components

Key components

A Symposium Agent system consists of five key components:

1) Switch components	Meridian 1 Option 11C and Options 51C through 81C or MSL-100 or DMS-100 are supported.
2) Symposium Agent Server 3) Telephony Server (TAPI Server)	The Symposium Agent Server software and Telephony Server (TAPI SP) software can reside on separate Windows NT 4.0 or Windows 2000 servers or on the same server.
4) Administrative PC	The Administrative PC is used to configure

	the Symposium Agent system. It must be equipped with Internet Explorer 4.0 or higher. TAPI SP and Symposium Agent administrative tasks can be performed from the same PC if the TAPI SP software is installed on the same server as Symposium Agent. Or, administrative tasks can be performed from a Symposium Agent 2.3 Client PC.
5)Symposium Agent Client PC	The Client PC must be equipped with Internet Explorer 4.0 or higher.

Both the Symposium Agent Server and the switch resources related to Symposium Agent need to be provisioned.

Required third-party software

Client

- Windows 95, Windows 98, Windows NT 4.0 (with Service Pack 5.0, or higher), or Windows 2000 Professional
- Microsoft Data Access Components (MDAC)
- DCOM (from Microsoft)
- TAPI 2.1 Remote Service Provider upgrade for Windows 95 clients

Server

- Windows NT 4.0 (SP 5.0) or higher operating system (configured as NTFS - NT File System)
- Windows 2000 Server
- Microsoft IIS 4.0 or higher web server software
- Sybase Adaptive Server 12
- Microsoft Transaction Server software

Other

- DMS/MSL-100 (release NA009 or MSL-08) or Meridian 1 (X11 Release 23 or higher)
- Symposium Call Center Server, Symposium Express Call Center Server, CompuCall ACD, or Meridian ACD
- TAPI 2.1 Server
- Direct connect (Ethernet AML), Meridian Link (Release 5 or higher), CompuCall TAPI Driver (X.25), Symposium TAPI Driver for ICM (TCP/IP) or Symposium Call Center Meridian Link Services Module (MLSM) on Symposium Call Center Server or Symposium Express Call Center Server.

Note:

Sybase was chosen as the database in order to match other Symposium products such as Symposium Call Center Server and Symposium WebResponse Server.

Symposium Agent Server supports Sybase Adaptive Server 12. Symposium Agent Server can use an existing customer Sybase installation if it is version 11.5. Versions of Sybase earlier than 11.5 are not supported.

Technical support

Introduction

If you experience technical difficulties, ensure that you have downloaded the latest Service Updates, Performance Enhancement Packages (PEPs) and addenda for Symposium Agent. You can download Service Updates and PEPs from http://sulaco.europe.nortel.com:8080/mpl/index.cfm and download the latest installation or documentation addendum from www.nortel-sccs.com.

Nortel Networks personnel use pcAnywhere as a remote support tool. If you require remote support from Nortel Networks, it is recommend that you install pcAnywhere.

For a customized installation/configuration of Symposium Agent, contact your Nortel Networks representative.

Chapter 2

System configurations

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Introduction

Symposium Agent software can be installed on a server by itself (standalone configuration) or on a server with other software (coresident) and always requires a TAPI Server. Nortel Networks recommends installing Symposium Agent software and TAPI Server software on the same server. The TAPI Server software required depends upon the type of switch and telephones Symposium Agent will control or monitor. Symposium Agent can also operate in a Legacy ACD environment, Symposium Call Center Server environment, or Symposium Express environment. Refer to the section *Symposium Agent switch connectivity* in this chapter for detailed information. Symposium Agent must *not* be installed on a Symposium Call Center Server.

This section provides the minimum hardware and software requirements for implementing a Symposium Agent system.

Standalone configuration

Listed below are the minimum hardware and software requirements for a standalone Symposium Agent configuration.

Symposium Agent Server hardware requirements

- Pentium II PC 400 MHz or higher
- Minimum hard disk drive 6.0 Gbytes
- Minimum 256 Mbytes of RAM
- CD-ROM drive
- Network Interface Card
- Mouse
- VGA or SVGA Display (800 x 600 pixels)

Symposium Agent Server software requirements

- Windows NT 4.0 Server with Service Pack 5.0 (or higher), or Windows 2000 Server,
  Note: You can verify the service pack level during the early stages of the boot up. The service pack version appears next to the Windows NT build number.
- Internet Explorer 4.0 (or higher)
  Note: You can verify the version in Internet Explorer by choosing Help → About in Internet Explorer.

- Windows NT 4.0 Option Pack 4.0 (Internet Information Server and Transaction Server)
  Note: You can determine if these components are installed by checking the list in the Services on Windows NT (from the Start menu, choose Settings → Control Panel → Services).
- Microsoft Data Access Components 2.1 (or higher)
- Remote TAPI Service Provider (available with Microsoft's TAPI 2.1)
- Sybase Adaptive Server 12

TAPI server hardware and software requirements

In a standalone configuration, a separate server is required in addition to the Symposium Agent Server. The additional server is required to support installation of the TAPI SP software. Refer to the following documents to obtain guidelines for engineering the TAPI Server.

For Meridian 1 switch	Refer to the *Engineering and Capacity Rules for Windows NT using the Symposium TAPI Service Provider for Meridian 1 Release 2* (Document number P0889315)
For DMS-100 or MSL-100 switch	Refer to the *ICM TAPI Driver Network Manager's Guide*

Symposium Agent Client (agent workstation) requirements

Hardware

- Pentium II PC 200 MHz or higher
- Minimum 32 Mbytes of RAM
- Minimum free hard disk space 25 Mbytes
- Network Interface Card

Software

- Windows 95 (upgraded to Microsoft’s TAPI 2.1)
- Windows 98 or Windows NT 4.0 with Service Pack 5.0
- Windows 2000 Professional
- MDAC 2.1 (or higher)
- Microsoft Internet Explorer 4.0 (or higher)

Symposium Agent (administration workstation) requirements

The Symposium Agent system is administered through an Internet Explorer

browser. The administration workstation can be a PC whose characteristics match the client workstation requirements above, or a Symposium Agent Client workstation.

Coresident configuration

Listed below are the minimum hardware and software requirements for a Symposium Agent coresident configuration (with the TAPI Service Provider software installed on the Symposium Agent Server).

Symposium Agent Server hardware requirements

- Pentium II PC 400 MHz or higher
- Minimum hard disk drive 8.0 Gbytes
- Minimum 512 Mbytes of RAM
- CD-ROM drive
- Network Interface Cards CLAN and ELAN (if you are *not* using direct connect)
- Mouse
- VGA or SVGA Display (800 x 600 pixels)

Symposium Agent client (agent workstation) requirements

The Symposium Agent client requirements are the same as for the standalone configuration.

Symposium Agent (administration workstation) requirements

Symposium Agent and the TAPI Service Provider can be administered from the same Symposium Agent Server console. The Symposium Agent Server software requirements are the same as for the standalone configuration except that the Symposium TAPI Service Provider or ICM TAPI Driver software must be installed on the Symposium Agent Server and Microsoft's TAPI 2.1 software is installed on the server when Windows NT 4.0 Server Service Pack 4 is installed. The minimum hardware requirements increase, as noted above.

Note: Windows NT 4.0 Server Service Pack 5 and the MDAC 2.1 upgrade should be installed on the server just prior to the installation of the TAPI Server software.

Symposium Agent switch connectivity

Symposium Agent standalone and coresident configurations both require TAPI Server connectivity to a switch. Listed below are the possible switch connectivity configurations and the requirements for each configuration.

Note: Symposium Agent 2.3 cannot be used to monitor or control Multiple Appearance Directory Number (MADN) lines.

M1 switch

Symposium Agent 2.3 can connect via the TAPI Server to any Meridian 1 option 11-81 with X11 Release 23 or higher.

When TAPI Service Provider is deployed using Meridian Link 5 (Coresidency 6.03), the following is required:

- X11 Release 23 or higher
- Symposium TAPI Service Provider for Meridian 1, Release 2.1 or higher

When TAPI Service Provider is deployed with Symposium Call Center Server 1.1 or higher (1.5 is recommended), or Symposium Express 1.0:

- X11 Release 23 or higher
- Symposium TAPI Service Provider for Meridian 1, Release 2.1 or higher

When TAPI Service Provider is deployed using Symposium TAPI Service Provider Direct Connect Option:

- X11 Release 23 or higher
- Symposium TAPI Service Provider for Meridian 1, Release 2.1 or higher

For more information, refer to the TAPI Service Provider document *Reference Guide for Installing, Configuring, and Maintaining the Symposium TAPI Service Provider for Meridian 1 Release 2*, Publication ID 881938.

For other switch prerequisites, consult the *Sales and Marketing Bulletin* #1160, Revision 3.

Telephone requirements for M1

With the M1, Symposium Agent can be used with the following types of telephones: M2008, M2216, M2616, M3110, M3310, M3820, M3901, M3901, M3903, M3904, M3905 and 2500 type sets. Meridian 1 telephone sets associated with Symposium Agent 2.3 clients must be configured as AST sets.

MSL-100 switch

Symposium Agent 2.3 can be connected to any Meridian SL-100 with MSL09 or higher equipped with Symposium CompuCall TAPI Driver or Symposium TAPI Driver for ICM.

The ICM or CompuCall link must be data filled on the MSL-100 and the telephone sets associated with Symposium Agent 2.3 clients must be configured with the ECM or ACD SERVORD option.

The ICM Link requires an Ethernet Interface Unit (EIU) in the SL-100.

Telephone requirements for MSL-100

With the MSL-100, Symposium Agent can be used with the following types of telephones: M5000 series, Pots (single line), or M2000 series sets with IVD patch RIC88 on MSL09.

DMS-100 switch

Symposium Agent 2.3 can be connected to any DMS Centrex ACD environment with an Intelligent Call Management (ICM) link. It requires NA010 or higher software equipped with a Symposium TAPI Driver for ICM.

The ICM link must be datafilled on the DMS for the telephone sets associated with Symposium Agent 2 clients. The DMS must be configured with ICM and ACD software.

The ICM link requires an Ethernet Interface Unit (EIU) on the DMS and a router on both the DMS and customer premise end point, if the call center is on a different network than the DMS.

Telephone requirements for DMS-100

With the DMS-100, Symposium Agent can be used with the following types of telephones: M5000 series, and Pots (single line).

Chapter 3

Understanding server performance

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Introduction

To optimize the performance of the Symposium Agent system you need to consider certain operating conditions in order to determine the memory and disk storage requirements of the Symposium Agent Server.

Optimum performance of the Symposium Agent system is governed by four key factors:

1) Standalone server configuration vs. server coresidency with the Symposium TAPI Service Provider

2) The number of users who will be logged in and active simultaneously

3) The number of users who will be using call logs

4) The size and location of the web applications that will be used inside the framework of Symposium Agent

These factors are discussed on the following pages.

Key performance factors

Standalone server vs. coresidency with TAPI server

Nortel Networks recommends that the Symposium Agent Server software reside on the same server as the Symposium TAPI Service Provider for M1 software or the Symposium TAPI Driver for ICM software when the number of Symposium Agent users is less than 500. Establishing coresidency in this way minimizes LAN traffic and eases administration. When the number of users exceeds 500, it is recommended that separate sever platforms be used. In all cases the server platforms must be in the same domain as the agent PC that wishes to control the phone. If the agent PC is not in the same domain then a two-way trust relationship must exist between the domains.

The number of concurrent users

The Symposium Agent Server, when started by a single user, will launch two instances of the Microsoft Transaction Server service. Each MTX.EXE that is started will consume 5600 Kbytes of memory (5.6 Mbytes) initially. The amount of actual memory needed by the MTX.EXE services can grow based on the amount of use and information requested by the agent applications.

The amount of memory per agent login is approximately 500 Kbytes per client.

This figure includes all services accessed by the agent during the login to the server. This number was derived from an agent logging into the server with two Tabs assigned to them. The amount of memory needed for each agent will vary based on the number of Tabs used by the agent. After the initial login is complete, the size of the needed RAM will decrease based on the usage of the agents.

The amount of memory used per call = 8 Kbytes (TAPI requirement) + 4 Kbytes (Call Log entry) + (Symposium Agent) = Total Memory. Symposium Agent 2.3 will pass the 8 Kbytes per call plus any information presented to the agent for screen pops. This could increase the total per call memory to 512 Kbytes per call.

Notes: Additional memory will be used for call data and agent-to-agent messaging on a per call basis.

The 4 Kbytes used for Call Log generation will be released by the system after the information is written to the Sybase database.

The following table provides the break points for the number of agents and the amount of RAM needed. These configurations are the same for standalone or coresident server setups.

Server Configuration	Amount of RAM	Number of Agents
Pentium II 400 MHz CPU	256 Mbytes	100 Active Agents
Pentium II 400 MHz CPU	512 Mbytes	101 – 500 Active Agents
Pentium III 450 MHz CPU	768 Mbytes	501 – 800 Active Agents*
Pentium III 600 MHz CPU	1000 Mbytes (1 Gbyte)	800 – 1000*

* For more than 500 users, it is recommended that you use separate server platforms for TAPI Service Provider and Symposium Agent 2.3.

The size and location of the web applications

Symposium Agent includes Microsoft's IIS to support its basic framework and can be used to support the web applications used by the end user. However, the requirements of the web application such as memory and disk storage requirement may compete with Symposium Agent requirements. For example:

- Installation of the Symposium Agent 2.3 server software requires 30 Mbytes of disk space.
- Other components being installed are Sybase, Microsoft’s IIS, and Microsoft Transaction Server.
- Sybase requires a minimum of 250 Mbytes.

- The Symposium Agent database can be up to 2 Gbytes.
- The amount of memory used by the Symposium Agent application will depend on the number of Active Server Pages (ASP) assigned to the individual agent. The larger the number of pages, the more memory will be required by the server to update the agents.

The number of users who will be using Call Logs

Because each call record will consume 4 Kbytes of disk space for storage, the number of Call Logs being stored can increase the amount of storage space needed on the server, as shown in the following example:

16000 calls per hour + 4 Kbytes = 64000 Kbytes or 64 Mbytes

You must monitor the storage space on the server. Refer to the *Nortel Networks Symposium Agent Installation Guide* (provided on the Symposium Agent 2.3 CD-ROM) for the procedure to purge the database.

For each Call Log that is generated, 4 Kbytes is needed by the server for storage. This disk space can be recovered when the Call Logs are purged from the system.

CPU Utilization Vs. Call Processing Rate

Measurements have been taken in the lab using simple calls to determine the relationship between call processing rate and CPU utilization during steady state call processing. The results of this testing can be found in Appendix A.

Chapter 4

Understanding client features

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Introduction

For LAN connectivity, memory, and disk space requirements for a Symposium Agent Release 2.3 client PC, refer to Chapter 2, *System Configurations*. The minimum requirements include the amount of memory and disk space required for Symposium Agent software only. Refer to Microsoft documentation for memory and hard disk space requirements for each Microsoft component.

Symposium Agent software must be installed on the server and then uploaded to the client via a setup program in the Launcher folder of the server. For information, refer to the *Symposium Agent Installation Release 2.3 Guide*. The Symposium Agent client software includes the following features:

- automatic software update
- user login
- browser
- softphone (agentTelephony)
- tabs (agentTabs)
- call rules runtime
- telephony control
- license management
- language support
- graphical user interface

Client software features

Listed below are descriptions of the key Symposium Agent software modules.

Automatic software update

The automatic software update program is the only Symposium Agent software that needs to be installed initially on client machines. It downloads the latest versions of all other Symposium Agent client software from the server. This allows patches and upgrades to be easily delivered to customer sites without manually reinstalling software on each client machine. The automatic software update program has the ability to launch other programs. In the case of Symposium Agent, the program that is launched is the user login program.

User login

The user login program validates the user ID and password against the list of users and passwords stored in the Symposium Agent database. If validation succeeds, the login program starts the browser and call rules runtime programs. It then hides itself but stays alive.

Browser

The browser is a full-featured, telephony-enabled, Internet Explorer-based web browser. It contains a soft phone and tabs that correspond to web pages.

Softphone (agentTelephony)

The softphone is an ActiveX control that resides on the browser. It allows the user to perform telephony functions (answer, dial, hold/unhold, transfer, conference) and ACD agent functions (login/logout, go ready/not ready, make set busy/in service) through the computer keyboard without touching the physical telephone. Outbound calls (simple, transfer, or conference) are performed with the aid of a dial wizard that can make use of special dial plans or corporate directories. It is also possible to attach text to any outbound call. If the recipient of the call is also a Symposium Agent user, the text appears along with the incoming call. Symposium Agent supports a maximum of two lines.

Telephone numbers are not always dialed the way they appear in corporate directories or databases. For example, an electronic phone directory might contain the number 6125551212. If the user's area code is 612, that number might be dialed as 95551212 (remove the area code and insert 9 for an outside call). Dial plans are stored in the server database. The dial plan client software (nndpUser.dll) is an ActiveX component. If dial plans are in effect, this component examines all numbers to be dialed and makes available to the dial wizard possible modifications of the digits based on dial plans.

The soft phone has the ability to dial numbers from the customer's corporate directory, provided that the corporate directory is compliant with the Light-Weight Directory Access Protocol (LDAP). An example of an LDAP-compliant directory is Microsoft's Exchange server. The component responsible for retrieving LDAP data is NNLDAP.dll.

Tabs (agentTabs)

The tabs that appear on the browser are shortcuts to web URLs. When a tab is selected, the browser displays its associated URL. The following types of tabs may appear:

- Symposium Agent standard web pages (such as call logs, agent activity logs, and statistics)
- web pages for other Nortel Networks applications (such as Symposium WebResponse Server)

- web pages for other vendors' call center applications (such as Comverse call recording, and Symon call center statistics)
- customized call guides
- others, as required by the customer

Call information can be passed to these web pages. This allows easy construction of web-based call guides that are customized for a call center's needs. Different pages can appear on the tab based on call state (offering, connected, idle), and all of the pages are passed call data (for example, IVR digits, calling line id, dialed number).

Call rules runtime

The call rules runtime component is an ActiveX .EXE that is started by the login program. It allows screen pops or other interactions with third-party software through a variety of mechanisms (keystroke macros, DDE, or OLE) when telephone calls are made or received. The call rules runtime component is also responsible for passing telephony data to web URLs represented by the browser tabs.

Telephony control

Telephony control is provided by a Nortel Networks ActiveX Telephone Object (nato.exe) and an ActiveX .EXE component. This component is used by the browser's soft phone and by call rules runtime.

License management

License management is accomplished with the aid of Globetrotter's FlexLM software, which allows only a certain number of users to check out a feature at the same time. The number of simultaneous users is defined in a license file given to the customer by Nortel Networks when Symposium Agent is purchased. In addition, hardware protection is employed (via a dongle on a license server). When a Symposium Agent user logs in, a feature is checked out. When a Symposium Agent user logs out, the feature is checked back in. While a Symposium Agent user is logged in, the license manager heartbeat is periodically checked.

Language support

One attribute of a user in the Symposium Agent database is preferred language. Text strings in the user interface of both the browser and call rules runtime programs appear in the logged-on user's preferred language.

Graphical user interface

The browser uses a series of custom, light-weight Nortel Networks graphical user interface controls to achieve its unique look and feel. These controls include:

- pop-up menu
- grid
- toolbar/menu
- image list
- clipboard event viewer

Appendix A

CPU usage

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Introduction

This appendix describes the performance testing that was performed on the Symposium Agent product and provides a model that was derived from these tests. It further describes the calculations necessary for its use.

Load testing and data collection

Symposium Agent test environment

The following diagram illustrates the Symposium Agent test environment used for the testing as well as the transaction flow.

Network diagram for Symposium Agent stress test

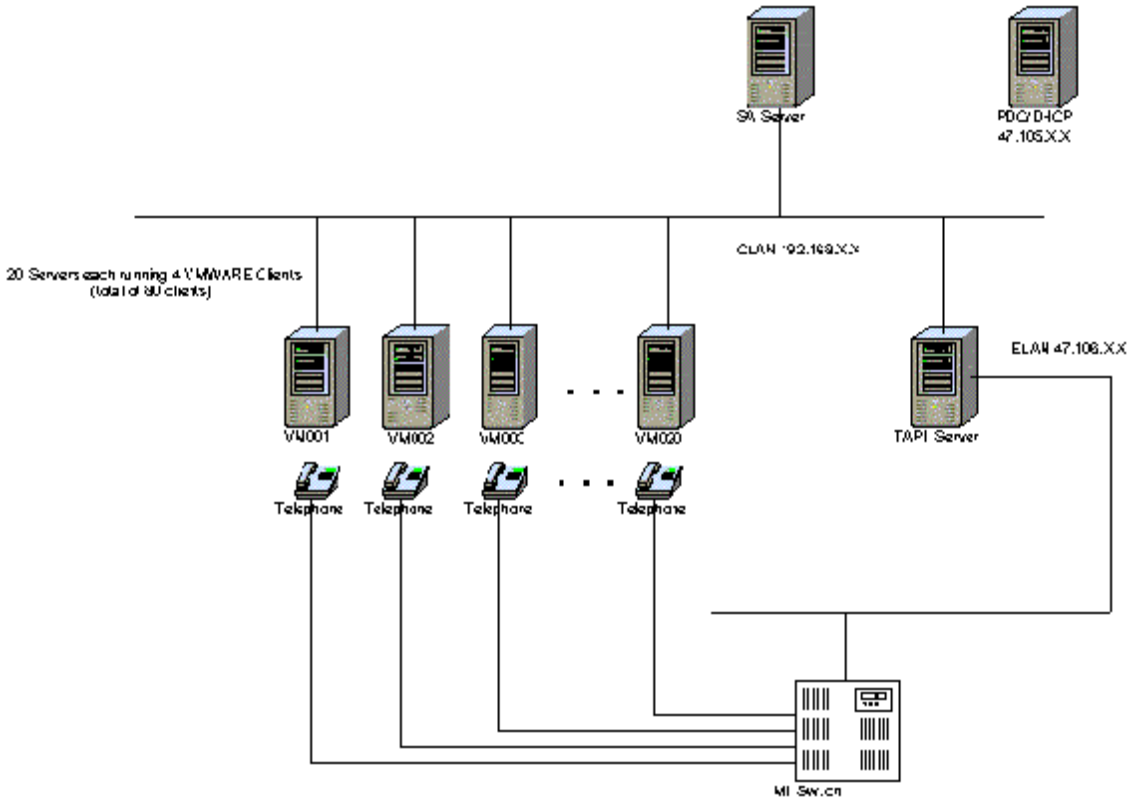


Figure 1: Symposium Agent Test Environment

Load tests and hardware/software configuration

Five test cases were performed following the Symposium Agent load test plan. Load tests up to 14,000 CPH were executed. System performance data was logged using Performance Monitor.

Equipment	Hardware	Software
TAPI server - standalone	PII 400 MHz (256 M RAM)	Windows 2000 , Symposium TAPI Server 2.3.0.10
Symposium Agent server – standalone	PII 400 MHz (128 M RAM)	Windows 2000, Sybase 12.0, Symposium Agent 2.3.0.4
PDC/DHCP server	PII 400 MHz (128 M RAM)	Windows NT 4.0, DHCP
Client host servers (20)	PII 500 MHz (256 M RAM	Windows NT 4.0 or higher, VMWare 2.0
Client – virtual (80)	4 Clients per host server	Windows 95, TAPI 2.1, MDAC 2.1, IE 4.0
Load generator	Ameritec Load Box	n/a
Switch	Meridian 1	X11 Release 23 or higher

Results

Four or the five tests had log files recording performance data. Results from three of the four remaining tests were found to be adequate for performance data extraction on the Symposium Agent server. All 4 of the log files were used for the TAPI server.

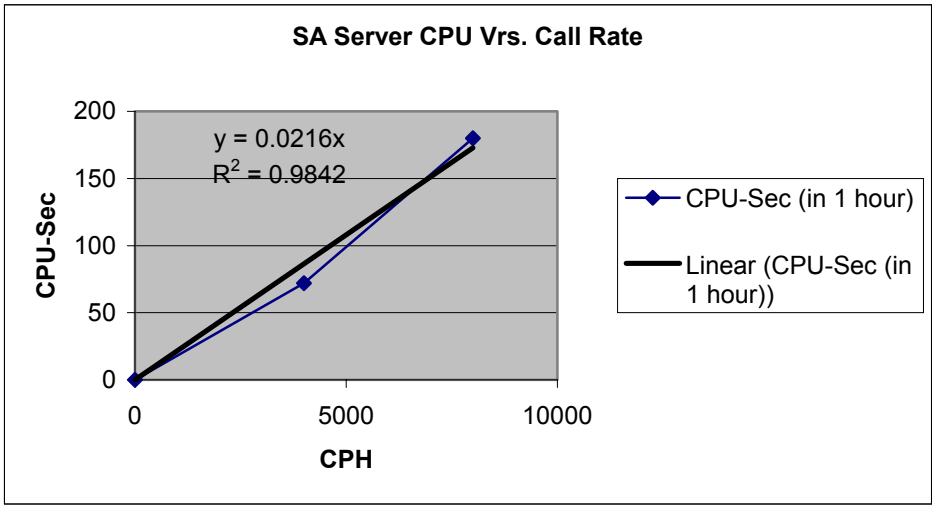
CPU loading measurement data

Performance Monitor logs were collected during the testing for test cases 2 through 5. (The SA Server log file for Test Case 4 contained corrupted data and therefore was not used. The corresponding TAPI log file was not corrupted and could be used.) This data was analyzed and a simple model of Symposium Agent CPU load as a function of call rate was derived.

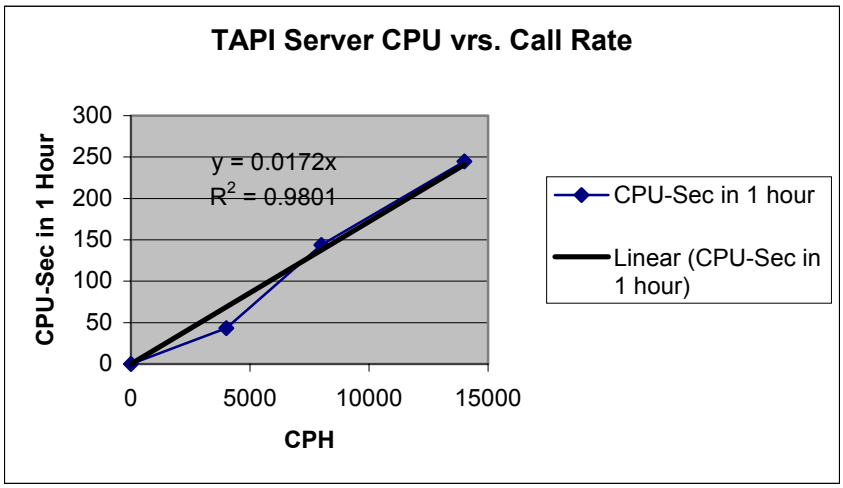
Note: These calls were simple calls and had no other processing associated with them.

The log data for the SA server and TAPI server are summarized below in the first and second tables respectively:

Test Case	Logfile	Platform	CPH	CPU (%)	CPU-Sec (in 1 hour)
2	NoLoad	PII400	0	10%	0
3	LiteLd_02116	PII400	4000	12%	72
5	MLd_0216	PII400	8000	15%	180



Test Case	Logfile	Platform	CPH	CPU (%)	CPU-Sec (in 1 hour)
2	NoLoad	PII400	0	1%	0
3	LiteLd_02116	PII400	4000	2%	43.2
5	MLd_0216	PII400	8000	5%	144
4	HLd_0215	PII400	14000	8%	244.8



CPU loading model

The test results show linear scaling of CPU usage with call load. CPU calibration values based on the above analysis are summarized in Table 1.

Internal Name	Measured Platform		Units	Measured Value	Scaled to PII400
	Processor	Memory			
SA_NL	PII400	256	%	10%	10%
TAPI_NL	PII400	256	%	1%	1%
SA_CPU	PII400	256	CPU-Sec	0.0216	0.0216
TAPI_CPU	PII400	256	CPU-Sec	0.0172	0.0172

Table 1

The equation for CPU estimation is given by:

$$U_{CPU} = \left(\upsilon + \frac{\lambda\mu}{3600} \right) * scale(CPU, BaseCPU)$$

where ν is the no-load CPU , λ is the call rate in CPH and μ is the CPU cost per call in CPU-Sec. Scale() is a scaling factor that scales the utilization to any processor desired (CPU) using the measured or base processor (Base CPU).

Scaling factors are shown in Table 2.

Processor	Base Rel
P75	7.33
P100	4.89
P166	2.75
PP200	2.00
PII266	1.45
PII300	1.33
PII333	1.20
PII350	1.14
PII400	1.00
PII450	0.91
PIII450	0.75
PIII500	0.68
PIII550	0.63
PIII600	0.58
PIII600E	0.53
PIII650	0.50
PIII667	0.48
PIII700	0.46
PIII733	0.45
PIII750	0.44
PIII800	0.42
PIII866	0.39
PIII933	0.36
PIII1.0B	0.34
PIV1.3G	0.27
PIV1.5G	0.24

Table 2

Dual processor scaling factors are obtained from the single processor by multiplying the corresponding Base Relative value by 2/3. For example, the base relative value of a PIII 733 is given in the table as 0.45. The dual base relative value then is 0.45 * 2/3 = 0.30.

Note that these processors are scaled relative to the PII400. Relative scalings to other processors can be calculated by taking the ratio of the unknown to known base relative values. For example, a base relative value for the PIII450 to a known value for the PII300 is calculated as 0.75/1.33 = 0.56

Example

Calculate the CPU load on a PIII 500 MHz for both TAPI and Symposium Agent Server for a call rate of 30,000 CPH:

I Symposium Agent server:

- $U_{CPU} = \left(\upsilon + \frac{\lambda\mu}{3600} \right) * scale(CPU, BaseCPU)$
- The no-load CPU on a PII400 for the Symposium Agent server is given in Table 1 as 10%
- L is 30,000 CPH and m is 0.0216 from Table 1
- Scale(PIII 933, PII 400) = 0.68 from Table 2.
- Thus $U_{CPU} = \left(0.1 + \frac{30000 * 0.0216}{3600} \right) * 0.68 = 0.19$ or 19%

II TAPI server:

- $U_{CPU} = \left(\upsilon + \frac{\lambda\mu}{3600} \right) * scale(CPU, BaseCPU)$

- no-load CPU on a PII400 for the TAPI server is given in Table 1 as 1%
- L is 10,000 CPH and m is 0.0172 from Table 1
- scale (PIII 933, PII 400) = 0.68 from Table 2.
- $U_{CPU} = \left(0.01 + \frac{30000 * 0.0172}{3600} \right) * 0.68 = 0.10$ or 10%

Summary

This report represents an analysis of the Symposium Agent performance data.

For the simple calls used in the testing, the data shows linear scaling as a function of call processing rate. A linear model was derived for estimating the CPU load on a given Intel processor resulting from the processing of simple calls.

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